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Rocket report

4 1 2011
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Sounding Rockets Program Office

In Brief...

The second testflight for the Terrier-Improved Malemute is scheduled for launch from Wallops Island, VA in January 2012.

A new high performance vehicle stack, Talos-Terrier-Oriole, is under evaluation with a possible test flight as early as summer 2012.

The Sounding Rockets Annual Report is available for download at:
<http://sites.wff.nasa.gov/code810/>

Congratulations to the NSROC II team for a well deserved Wallops Peer Award!

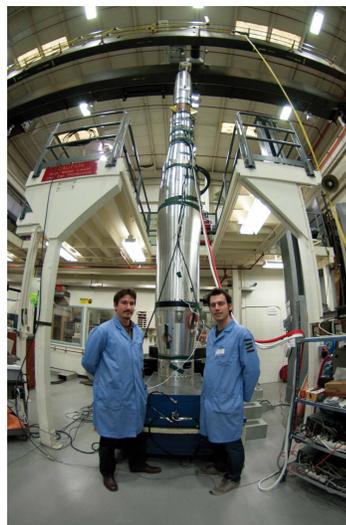
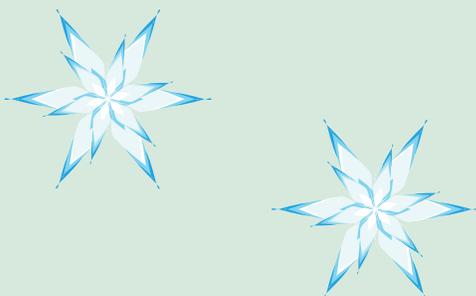


Photo by Berit Bland

Christopher Mendillo and Brian Hicks with the payload at Wallops.

36.225 Chakrabarti – PICTURE launched October 8, 2011

The Planet Imaging Concept Testbed Using Sounding Rocket (PICTURE) was designed to take the first step towards direct imaging of exoplanets using nulling interferometers. It is a collaboration between Boston University (BU), Jet Propulsion Laboratory (JPL), NASA Goddard Space Flight Center (GSFC) and Charles Stark Draper Laboratory (Draper). PICTURE's original goal was to directly image in visible spectral region Epsilon Erdani b, a Jupiter-like planet in a highly elliptical orbit around a Sun-like star. However, due to programmatic difficulties, some of the key components could not be

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41.093 & 41.094 Robertson – CHAMPS launched November 11 & 13

The Charge and mass of Meteoritic Smoke Particles (CHAMPS) rockets were launched from Andoya Rocket Range in Norway on November 11 and 13th.

The scientific objectives of the two rockets were to detect and measure the meteoritic smoke particles (MPS) in the mesosphere that have

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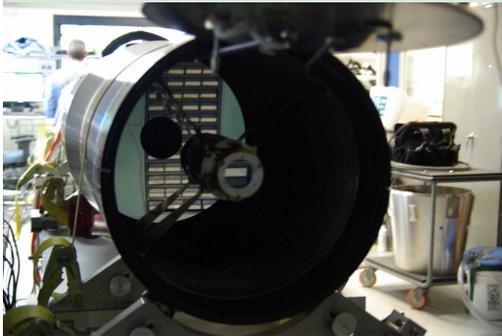
CHAMPS launches from Andoya Rocket Range, Norway

Photo by Trond Abrahamssen/Andoya Rocket Range

Rocket Report

36.225 Chakrabarti cont.

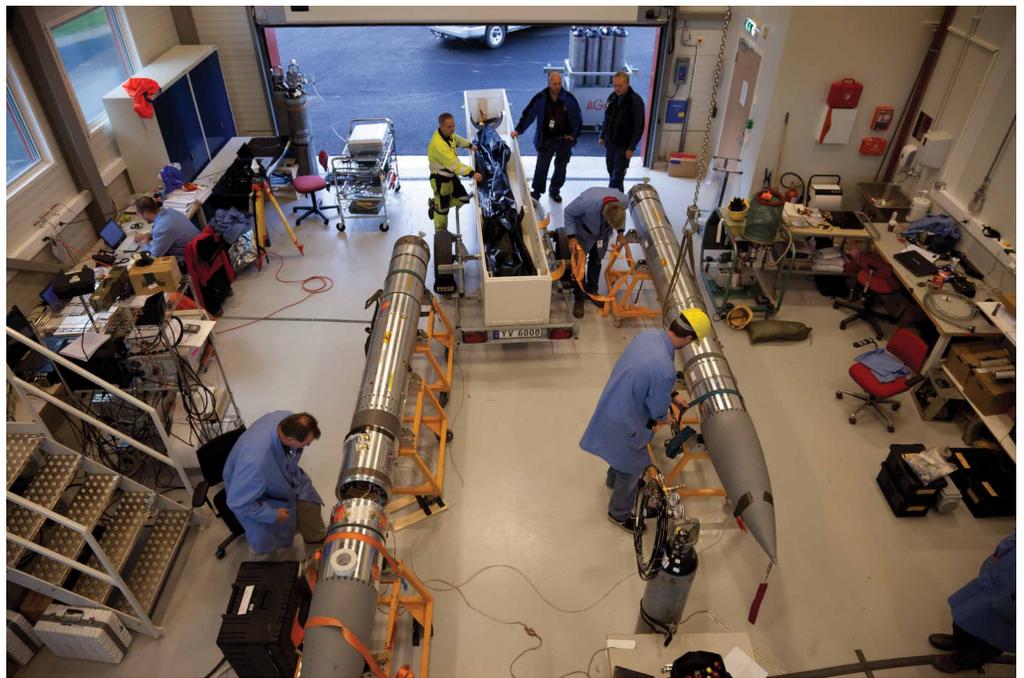
developed in a timely fashion, which made it impossible to attain the original goal. Nonetheless, PICTURE can image the debris disk around Epsilon Eridani which are similar to the asteroid belt of our Sun. Such information will tell us about the process of planet formation around stars. PICTURE attempted to flight qualify several key technologies necessary for exoplanet exploration such as, extremely lightweight mirror, visible nulling coronagraph, deformable mirror and 0.5 milli arc-sec pointing.



Mirror installed in the payload.

41.093 & 41.094 Robertson cont.

long been thought to be the condensation nuclei for noctilucent clouds. The rockets were designed to gather data on the number density and mass distribution of MSPs as a function of altitude and their sign of charge, with and without solar illumination. The launches were conducted from the Andoya Rocket Range in Norway in order to benefit from simultaneous meteor radar and lidar observations that will give a more comprehensive view of the state of the mesosphere.



Robertson payloads being prepared for flight.

Photo by Chris Perry/Wallops Imaging Lab

36.264 McCammon launched from White Sands, November 6, 2011.

The purpose of this mission is to measure the spectrum of the diffuse X-ray emission from the interstellar medium over the energy range 0.07 to 1 keV. The Soft X-ray Background (SXR) has been studied for about twenty years, primarily with proportional counters. The source of the SXR has long been modeled as a hot, low-density interstellar plasma ($T \sim 10^6$ K). However, recent models suggest that some component of the 0.07 to 1 keV emission may be originating from the interaction of our solar wind with interplanetary neutral gas. The mechanism for such heliospheric emission is called Solar Wind Charge Exchange (SWCX). This mechanism is thought to be responsible to X-ray emission observed from comets and the earth's extreme outer atmosphere. Using a large-area array of microcalorimeter detectors with a 60 field of view operating at a temperature of 0.05 K, this experiment should be able to capture a spectrum of the SXR with enough resolution and statistics to place limits of the amount of SWCX contribution to the SXR. The previous flight, 36.223, was targeted at a high galactic latitude position ($l, b = 90^\circ, +60^\circ$) where interstellar emission from million-degree gas should dominate by at least a factor of two.

The current flight will aim at a target near the Galactic plane in the direction of the anticenter ($l, b = 165^\circ, -5^\circ$; or $150^\circ, 0^\circ$).

Interstellar X-ray emission is a minimum in this direction, and the best theoretical calculations of SWCX estimate that it provides all of the observed X-rays. Therefore a comparison of this spectrum with the one from 36.223 should show a distinct difference if SWCX is as strong as expected.



McCammon team with rocket at WSMR.

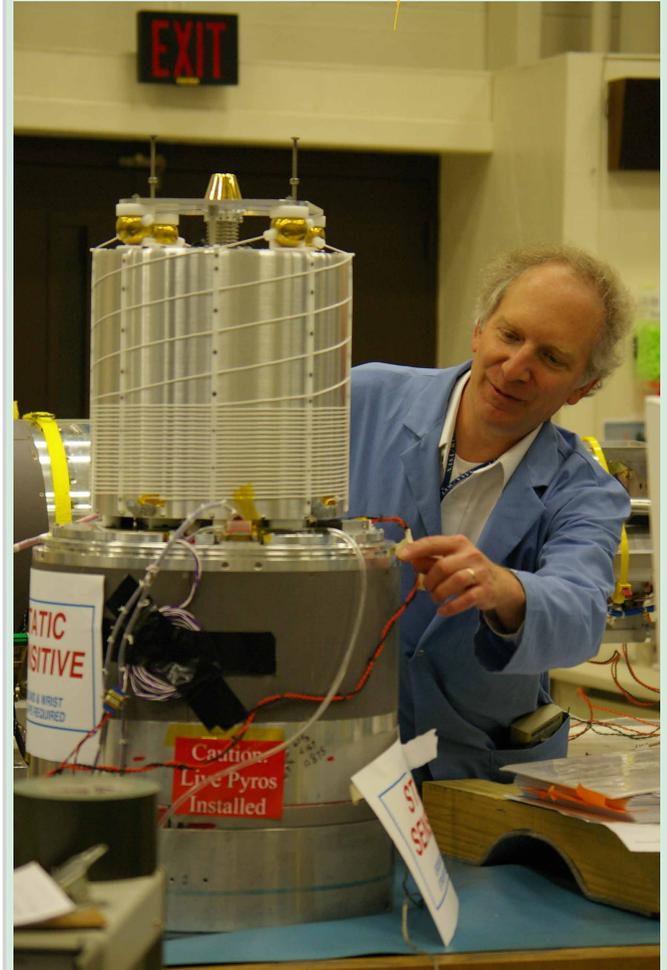
Integration and Testing

36.273 Powell – Magnetosphere–Ionosphere Coupling in the Alfvén resonator (MICA)

The MICA (Magnetosphere–Ionosphere Coupling in the Alfvén resonator) sounding rocket will measure ion temperature and density, electron temperature and density, electron precipitation, ion upflow, convection and ULF electric fields, magnetic fields from which field–aligned current (FAC) can be inferred, and plasma waves. The objectives of the experiment are to investigate the role of active ionospheric feedback in the development of large amplitude and small scale electromagnetic waves and density depletions in the low altitude (< 400 km), downward current, auroral ionosphere.



Valerie Gsell and Tim Wilson preparing for a sequence test.



Principal Investigator, Steve Powell, with experiment package.

36.268 McCandliss – Far–ultraviolet Off Rowland–circle Telescope for Imaging and Spectroscopy (FORTIS)

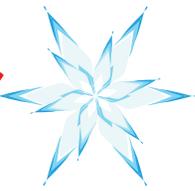
The FORTIS team from Johns Hopkins, lead by PI Dr. Stephen McCandliss visited Wallops to conduct vibration testing of the Micro Shutter Array part of the FORTIS payload.

The primary purpose of the FORTIS mission is to be the first to investigate Lyman alpha escape from nearby star–forming galaxies and to quantify its relationship to the local gas–to–dust ratio using multi–object farultraviolet (FUV) spectroscopy. FUV observations will be conducted using the FORTIS; a multi–object spectro/telescope with a Micro Shutter Array (MSA) designed to observe extended bright HII regions of low red–shift star–forming galaxies. It is envisioned this mission will serve as a pathfinder for future orbital spacecraft.



P.I. Dr. Stephen McCandliss and the Johns Hopkins team at Wallops for a vibration test of the Micro Shutter Array for the FORTIS payload.

Holiday Greetings!



From Phil Eberspaker/Chief Sounding Rockets Program Office:

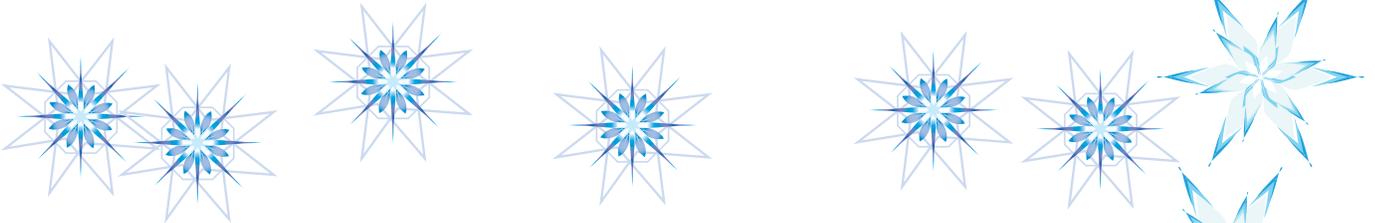
The first full year of the new NSROC II contract ended in October and we have seen outstanding support throughout the entire period from NSROC. We have also had great support from AETD, and as always, the SRPO staff has made my life a lot easier! While we have been battling significant technical issues on several fronts, we have been able to continue flying missions, with the last flight, Cash 36.274, successfully flown in December from White Sands Missile Range. The two CHAMPS payloads successfully flown from Norway were the culmination of Dr. Robertson's long career in sounding rockets. It was great we could end his career in spectacular fashion! Work has progressed on new launch vehicles with the second test flight of the Terrier-Improved Malemute coming up early in the new year. We have also really impressed folks at HQ with our exciting and unique educational flight projects.

It is quite apparent that these kinds of accomplishments cannot be achieved without a dedicated team. I am proud to lead a diverse team of people who poses unique skills, an unstoppable "can do" attitude, and exceptional enthusiasm for conducting the world's premiere suborbital research rocket program. I'm sure that everyone shares this pride, and hope that everyone will remain inspired to keep us successful long into the future.

As always, make sure you spend time with family and friends, not only during the holiday season, but throughout the entire year! Thank you very much for your dedication and have a happy and safe holiday season.

Sincerely,

Phil



From Joe Schafer, NSROC Program Manager

Season's greetings,

On behalf of the Orbital Sciences and the NSROC management, we thank our customers, colleagues and peers for the opportunity to contribute to your program. Together we have a) overcome issues with the Flight Termination System allowing us to re-start missions at the White Sands Missile Range, b) improved the safety of our work-space and c) been successful with eleven of our last twelve missions. We have thoroughly enjoyed the different opportunities to excite our nation's youth with science and technology, from simple hardware tours to supporting educational rocket launches. It's been exciting, and we expect next year will be no different.

God Bless You All,

/Joe/



Rocket Report

Picture Place...

- ① Roy Tolbert wearing an appropriate hat when Miguel Larsen and his team from Clemson (picture 2) conduct a lithium burn on Wallops Island.
- ② Team inspecting lithium canister after burn.
- ③ Lithium burn on Wallops Island.
- ④ Andrew Muesler and Walt Suplick preparing ALVS for vibration testing.
- ⑤ Clay Merscham and Shane Thompson working on 36.273 Powell.



Want to contribute?

Working on something interesting, or have an idea for a story? Please let us know, we'd love to put it in print!

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- 36.268 UG MCCANDLISS/JHU WS JAN
- 36.277 UG BOCK/CAL TECH WS FEB
- 36.273 UE POWELL/CORNELL UNIVERSITY FB FEB
- 36.255 US KRUCKER/UNIV OF CA @ BERKELEY WS MAR
- 36.271 UG BEASLEY/UNIVERSITY OF COLORADO WS MAR
- 36.261 UG CLARKE/BOSTON UNIVERSITY WS MAR
- 46.002 UE LARSEN/CLEMSON UNIVERSITY WI MAR
- 45.004 UE LARSEN/CLEMSON UNIVERSITY WI MAR
- 41.097 UE LARSEN/CLEMSON UNIVERSITY WI MAR
- 41.098 UE LARSEN/CLEMSON UNIVERSITY WI MAR
- 46.003 UE LARSEN/CLEMSON UNIVERSITY WI MAR
- 36.260 UG COOK/BOSTON UNIVERSITY WS MAR
- 36.235 US HARRIS/UNIV. OF CALIFORNIA, DAVIS WS APR
- 36.269 GS RABIN/NASA-GSFC WS APR
- 39.011 NR CHEATWOOD/NASA-LARC WI APR
- 36.239 DS KORENDYKE/NRL WS MAY
- 36.253 US HASSLER/SWRI WS JUN
- 36.286 UE WOODS/UNIV. OF COLORADO WS JUN
- 41.101 UO KOEHLER/UNIVERSITY OF COLORADO WI JUN
- 36.272 NSCIRTAIN/MSFC WS JUN
- 36.284 NS CIRTAIN/MSFC WS JUN
- 12.075 GT BRODELL/NASA-WFF WI JUN
- 36.263 USJUDGE/USC WS JUL
- 46.004 GO ROSANOVA/NASA-WFF WI AUG
- 46.001 UE KUDEKI/UNIVERSITY OF ILLINOIS KWAJ SEP
- 45.005 UE KUDEKI/UNIVERSITY OF ILLINOIS KWAJ SEP
- 41.100 DR CATON/USAF KWAJ SEP
- 41.102 DR CATON/USAF KWAJ SEP
- 36.262 UG KAISER/JHU WS OCT
- 36.245 UH FIGUEROA/MIT WS NOV
- 36.259 GH GENDREAU/NASA-GSFC WS DEC
- 36.283 UH GALEAZZI/UNIVERSITY OF MIAMI WS DEC
- 36.173 UG NORDSIECK/UNIV. OF WISCONSIN WS TBD
- 41.089 GP HALL/NASA-WFF WI TBD

Congratulations NSROC II Team for the Wallops Peer Award!

